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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/741,122	12/19/2000	Ulf Mikael Ronstrom	43605-00023USPX	6406

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EXAMINER

BRAGDON, REGINALD GLENWOOD

ART UNIT	PAPER NUMBER
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2188

DATE MAILED: 10/02/2003

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/741,122

Applicant(s)

RONSTROM, ULF MIKAEL

Examiner

Reginald G. Bragdon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 December 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4, 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The Information Disclosure Statements received 08 March 2001 and 02 January 2002 (copy received 07 January 2002) have been considered. Please see the attached PTO-1449(s).

Drawings

3. Figures 1-1 and 1-2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).
4. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

5. Claims 1-26 are objected to because of the following informalities:

As per claim 1, line 16, --a particular-- should be added before "data object" and --particular-- should be added before "access frequency". This suggestion is made because

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without this distinction, “said access frequency” and “said data object” in claim 3 would lack antecedent basis.

As per claim 1, line 17, --the one or more-- should be added before “data”.

As per claim 2, line 3, --in-- should be added before “each data storage”.

As per claim 2, lines 4-5, “said” should be --an-- since no particular “access frequency range” was set forth in claim 1.

As per claim 2, line 6, “region” should --section-- and “sections” should be --regions--.

As per claim 3, line 3, --particular-- should be added before “access” and “data”.

As per claim 4, line 20, “said” should be deleted since “access frequencies” of a particular range have not previously been set forth.

As per claim 4, line 21, “said” should be deleted since “access frequencies” of a particular range have not previously been set forth.

As per claim 4, line 22, --of an access frequency range-- should be added before “of an i-th”.

As per claim 4, line 29, “said upper” should be --an upper--.

As per claim 4, line 29, --of said i-th data storage section-- should be added after “value”.

As per claim 4, line 30, “(i-1)-th” should be --(i+1)-th--.

As per claim 4, line 33, “said lower” should be --a lower--.

As per claim 4, line 34, --of said (i+1)-th data storage section-- should be added after “value”.

As per claim 5, line 10, “said” should be --an--.

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As per claim 5, line 12, "said" should be --the-- since a "corresponding upper access frequency threshold" has not been expressly set forth previously.

As per claim 5, line 13, "said (i-1)-th" should be --an (i+1)-th--.

As per claim 5, lines 17-18, "said" should be --the-- since a "corresponding lower access frequency threshold" has not been expressly set forth previously.

As per claim 5, line 19, "said" should be --an--.

As per claim 8, lines 4 and 6, "(RDS-i)" should be deleted.

As per claim 10, line 16, --the one or more-- should be added before "data regions".

As per claim 10, line 20, "&" should be --and--.

As per claim 11, line 9, --the-- should be added before "one or more".

As per claim 11, line 17, --the one or more-- should be added before "data".

As per claim 11, line 20, "said" should be deleted.

As per claim 11, line 21, "said" should be deleted.

As per claim 11, line 22, --of an access frequency range-- should be added before "of an i-th".

As per claim 11, line 28, "said access" should be --an access--.

As per claim 11, line 29, "said upper" should be --an upper--.

As per claim 11, line 29, --of said i-th data storage section-- should be added after "value".

As per claim 11, line 33, "said lower" should be --a lower--.

As per claim 11, line 33, --of said (i+1)-th data storage section-- should be added after "value".

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As per claim 14, line 3, "disc data base region" should be --primary memory--.

As per claim 14, line 5, "main memory" should be --secondary memory--.

As per claim 15, line 8, --the-- should be added before "one or more".

As per claim 15, line 17, --one or more-- should be added after "said".

As per claim 15, line 24, --the one or more-- should be added before "data regions".

As per claim 15, line 25, "said" should be --a--.

As per claim 16, lines 4-5, "said" should be --an-- since no particular "access frequency range" was set forth in claim 15.

As per claim 16, line 6, "said data" should be --a data--.

As per claim 16, lines 7-8, "region" should --section-- and "sections" should be --regions--.

As per claim 18, line 3, --update a-- should be added before "physical".

As per claim 19, line 9, --the-- should be added before "one or more".

As per claim 19, line 18, --one or more-- should be added before "data regions".

As per claim 19, line 25, --the one or more-- should be added before "data".

As per claim 19, line 26, "said" should be --a--.

As per claim 19, line 29, --of an access frequency range-- should be added before "of an i-th".

As per claim 19, line 34, "said i-th" (second instance) should be deleted.

As per claim 19, line 36, "said upper" should be --an upper--.

As per claim 19, line 37, --of said i-th data storage section-- should be added after "value".

As per claim 19, line 42, "said lower" should be --a lower--.

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As per claim 19, line 43, --of said (i+1)-th data storage section-- should be added after “value”.

As per claim 20, line 11, “said” should be --the-- since a “corresponding upper access frequency threshold” has not been expressly set forth previously.

As per claim 20, lines 16, “said” should be --the-- since a “corresponding lower access frequency threshold” has not been expressly set forth previously.

As per claim 20, line 17, “said” should be --an--.

As per claim 25, line 9, --the-- should be added before “one or more”.

As per claim 25, line 12, --the one or more-- should be added before “data regions”.

As per claim 25, line 18, --one or more-- should be added after “said”.

As per claim 25, line 25, --the one or more-- should be added before “data regions”.

As per claim 25, line 26, “said” should be --a--.

As per claim 25, line 29, “&” should be --and--.

As per claim 26, line 10, --the-- should be added before “one or more”.

As per claim 26, line 13, --the one or more-- should be added before “data regions”.

As per claim 26, line 19, --one or more-- should be added after “said”.

As per claim 26, line 26, --the one or more-- should be added before “data regions”.

As per claim 25, line 27, “said” should be --a--.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art in view of Christenson et al. (6,324,620).

As per claims 1, 10, 15, and 25-26, Applicant's admitted prior art teaches a database system comprising a disc device D ("primary memory") which stores a plurality of data blocks organized as pages, where each page consists of one or more data objects. The database system also includes a main memory MM ("secondary memory device") connected to a processor PM. See figure 1-1 and page 2 of the specification. Within the main memory is a resident data memory section that includes a plurality of regions which store the pages (see page 7). Applicant's admitted prior art also teaches the storage of "hot", "warm", and "cold" pages, where the determination of whether a page is "hot", "warm" or "cold" is based on access frequency (i.e. the number of accesses in a unit time period).

Applicant's admitted prior art does not teach creating "data storage sections" within the resident data section for separately stores "hot" and "cold" pages. Christenson et al. teaches that it was known to create "hot" and "cold" partitions within a storage device for the storage of "hot" and "cold" data (based on access frequency). See column 3, lines 9-20, and column 9, lines 26-32. Christenson et al. also teaches the creation of partitions for storing average data (i.e. "warm" data). See column 9, lines 32-37. It would have been obvious to one of ordinary skill in

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the art to have modified Applicant's admitted prior art such that the resident data section is partitioned into "hot", "warm" and "cold" sections, as suggested by Christenson et al., because Christenson et al. teaches that this would relieve the memory bottleneck of a computer system and increase the speed of the system. See column 2, lines 35-37.

As per claims 2 and 16, Christenson et al. teaches "hot", "average" (i.e. warm), and "cold" regions of the memory device, which each regions having a predetermined access frequency. See column 7, lines 13-25. As set forth above, Christenson et al. teaches moving data among the regions of data.

As per claims 3 and 17, the combination of Applicant's admitted prior art and Christenson et al. does not teach storing the access frequency with the data in the memory. However, it would have been obvious to one of ordinary skill in the art to stored the access frequency with the data in the memory because this would simplify the process of determining whether data should be moved from one "warmth" section to another "warmth" section.

As per claims 4 and 19, the claim is rejected for the reasons set forth for claim 1, above, further noting that the access frequencies of the hot section ("($i+1$)-th" data storage section") are greater than the access frequencies of the average (warm) section ("i-th" data storage section"). It is readily apparent that each "warmth" section contains an upper and lower threshold. Christenson et al. further teaches moving data between "warmth" sections based on the access frequency of a datum. See column 10, lines 35-37.

As per claims 5 and 20, Applicant's admitted prior art teaches that the main memory includes a page cache memory section ("first memory") and a resident data memory section

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("second memory"). See figure 1-1. The transfer of data between "warmth" sections of the page cache memory section is taught as set forth above for claim 4.

As per claims 6 and 21, Applicant's admitted prior art teaches that the primary memory device is a disc device which stores a database, where the blocks on the disc consists of pages comprised of objects of a plurality of bytes. The secondary memory device is a main memory of the processor PM, which includes a page cache section and a resident data section.

As per claims 7 and 22, Applicant's admitted prior art teaches that part of a database page or record may always reside in the resident data section and other parts of the page or record only reside in the page cache memory occasionally.

As per claims 8-9 and 23-24, Christenson et al. teaches thresholds for the partitioning and data movement. See column 6, lines 64-65.

As per claim 11, the claim is rejected for the reasons set forth above for claim 4, further noting that Applicant's admitted prior art teaches a hash table HT storing physical references. It would have been obvious to one of ordinary skill in the art to have updated the physical reference to an object in the hash table when the object was moved in order to prevent errors in accessing an object, thereby deteriorating the functioning of the system.

As per claim 12, the hash table is an index structure.

As per claims 13-14, Applicant's admitted prior art teaches that part of a database page or record may always reside in the resident data section and other parts of the page or record only reside in the page cache memory occasionally and can be easily moved. See page 7. As set forth for claim 11, the hash table must be updated when a part of page is moved in order to prevent errors in accessing an object.

As per claim 18, the claim is rejected for the reasons set forth above for claim 15, further noting that Applicant's admitted prior art teaches a hash table HT storing physical references. It would have been obvious to one of ordinary skill in the art to have updated the physical reference to an object in the hash table when the object was moved in order to prevent errors in accessing an object, thereby deteriorating the functioning of the system.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Chilimbi et al. (6,330,556) teaches co-locating hot objects in cache lines.

Banerjia et al. (2001/0049818) teaches migrating translations from cold to hot partitions in a cache.

9. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

The fax phone numbers for the organization where this application or proceeding is assigned are as follows:

(703) 746-7238	(After Final Communications)
or	
(703) 746-7239	(Official Communications)
(703) 746-7240	(For Status inquiries, draft communications)
and/or	
(703) 746-5693	(Use this FAX#, only after approval by the Examiner, for "INFORMAL" or "DRAFT" communications. An Examiner may request that a formal page/amendment be faxed directly to them on occasion).

Hand-delivered responses should be brought to Crystal Park II, 2121
Crystal Drive, Arlington, VA., Fourth Floor (receptionist).

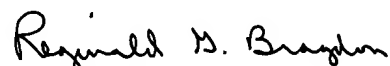
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10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Reginald G. Bragdon whose telephone number is (703) 305-3823. The examiner can normally be reached on Monday-Thursday from 7:00 AM to 4:30 PM and every other Friday from 7:00 AM to 3:30 PM.

The examiner's supervisor, Mano Padmanabhan, can be reached at (703) 306-2903.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3900.

RGB
September 23, 2003


Reginald G. Bragdon
Primary Patent Examiner
Art Unit 2188